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EXPERIMENTAL STUDIES ON ASCITIC ABSORPTION

by

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INTRODUCTION

Since 1863, when v. RECKLINGHAUSEN, using the term "stoma", discussed the peritoneal absorption, numerous studies have been reported. On absorbability of the ascitic peritoneum, however, there are very few comments in the world literatures except for the results of modern isotope technique. Ascites in the peritoneal cavity has been vaguely thought to be the fluid accumulated due to unbalance between production and absorption. With the ascitic dogs, experimentally produced by supra-diaphragmatic constriction of the inferior vena cava, I studied the absorbability of the peritoneum with various substances comparing with that of normal dogs.

ADMINISTRATION OF P^{32} INTO THE PERITONEAL CAVITY

1. Materials and methods

Five normal adult mongrel dogs weighing about 10 kg and five ascitic dogs were used. After administration of P^{32}, 10 μc per kg of body weight, into the peritoneal cavities of normal dogs and ascitic dogs (after ascites has been emptied), the blood samples from the V. femoralis and the lymph samples from the thoracic duct fistula were collected by every five minutes for the first one hour, every ten minutes for the second one hour and every thirty minutes for the later three hours. Every sample was counted with Geiger-Miller counter.

2. Results

a) Normal dogs
Results are shown in Table 1 and Figure 1.

b) Ascitic dogs
Results are shown in Table 2 and Figure 2.

3. Summary of this chapter

Each mean value described above shows that P^{32} appears into the blood stream of normal dog within five minutes and reaches peak after some thirty minutes which maintains approximately the same level following four and half hours. In ascitic dog, P^{32} appears into the blood stream within five minutes and gradually increases for three hours. However, in every case the level is far below than that of normal dog (Fig. 3).

Concerning the thoracic duct lymph, P^{32} appears faster into the lymph stream of ascitic dog than that of normal dog. This is probably due to the high velocity

of the lymphatic flow of the thoracic duct in ascitic dog. In normal dog, the count increases abruptly until one hundred minutes after the administration of P^{32}. On the contrary, in ascitic dog, increase of the count is slow and the highest value is lower than that of normal dog (Fig. 4).

In normal dog, P^{32} appears into the blood stream within five minutes, reaches peak after about thirty minutes which keeps nearly the same level. Appearance of P^{32} into the lymphatic flow is later than that of the blood stream, but the value of the lymph reaches higher peak than that of the blood abruptly and then decreases quickly to the level of the blood (Fig. 5).

In ascitic dog, the highest value of the blood and lymph are lower than that of normal dog, but the inclination of the curve is the same as in normal dog (Fig. 6).

In conclusion, it will be able to say that the peritoneal absorbability of P^{32} in ascitic dog is inferior to that of normal dog. And both blood and lymph serve as the pathway of absorption. And then, lymphatic absorption can be considered to begin later than blood stream absorption.

Tab. 1

Min.	No. 1		No. 2		No. 3		No. 4		No. 5	
	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph
5	55	0	56	0	50	0	14	0	88	0
10	115	0	68	46	56	0	28	0	78	19
15	147	53	91	74	79	44	42	28	105	67
20	159	125	72	128	73	63	41	60	91	91
25	138	194	101	144	74	86	50	67	111	77
30	207	213	151	140	93	126	49	62	91	124
35	165	231	107	173	104	126	43	72	110	130
40	168	256	109	182	88	119	56	81	112	133
45	201	308	123	165	90	125	31	85	104	136
50	198	299	140	179	81	130	45	75	99	125
55	218	379	124	192	97	137	56	81	100	144
60	203	362	113	189	91	137	50	69	80	133
70	269	394	161	203	79	135	39	92	105	125
80	191	433	161	179	72	118	60	85	105	115
90	184	436	111	165	65	133	50	84	165	97
100	202	267	136	135	83	120	73	103	112	87
110	186	259	136	135	61	80	58	83	98	106
120	206	213	143	111	61	64	52	71	108	87
150	186	214	150	101	76	81	56	64	106	88
180	159	158	139	85	48	59	60	66	110	90
210	180	114	111	93	54	52	71	46	110	77
240	170	118	126	85	66	42	75	52	130	87
270	157	88	111	70	60	41	80	49	133	84
300	164	82	128	73	51	70	83	40	140	100

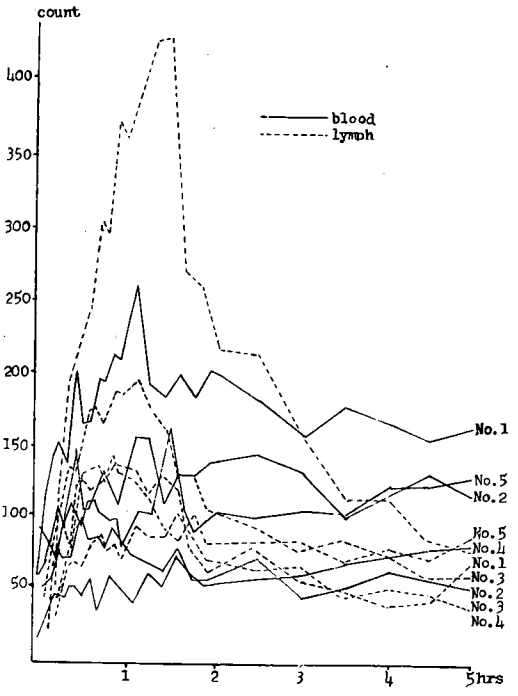

Fig. 1

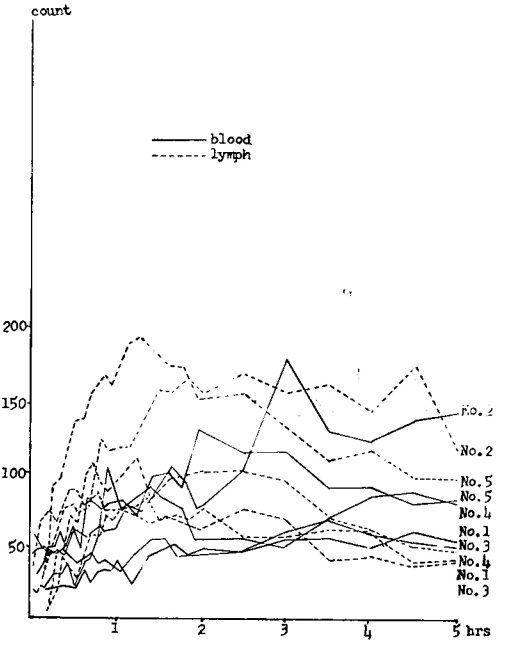

Fig. 2

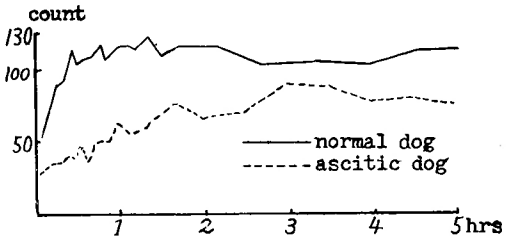

Fig. 3

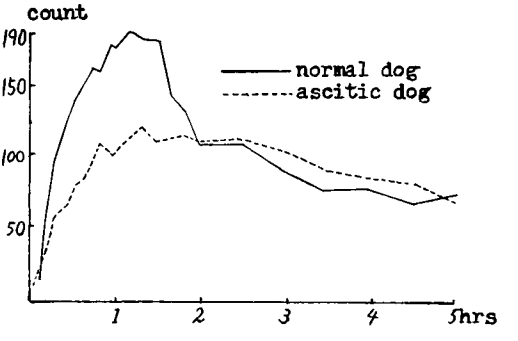

Fig. 4

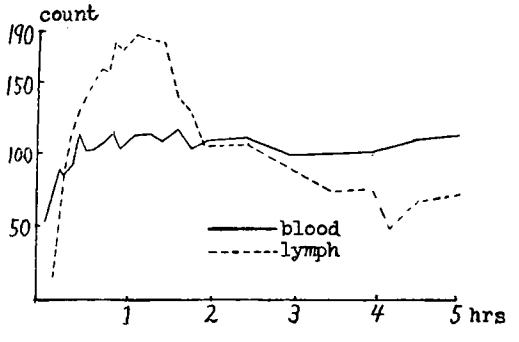

Fig. 5

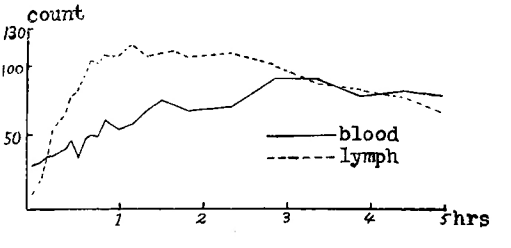

Fig. 6

ADMINISTRATION OF DIRECT SKY BLUE SOLUTION INTO THE PERITONEAL CAVITY AND VEINS

1. Materials and methods

Normal adult mongrel dogs weighing about 10 kg and ascitic dogs with constriction of the thoracic inferior vena cava were used.

Following three methods were adopted.

a) Direct Sky Blue solution (1cc per kg of body weight) was administered into the peritoneal cavity of both normal and ascitic dogs (ascites had been emptied).

b) Direct Sky Blue solution (0.25 cc per kg of body weight) was injected into the right V. femoralis of normal and ascitic dogs.

c) Direct Sky Blue solution (0.25 cc per kg of body weight) was injected into the left V. cephalica antebrachii of ascitic dogs.

In all cases, samples were collected from the right A. femoralis and the thoracic duct fistula every five minutes for the first one hour, every ten minutes for the second one hour, and every thirty minutes for the later three hours after the ad-

Tab. 2

Min.	No. 1		No. 2		No. 3		No. 4		No. 5	
	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph
5	0	0	59	0	40	34	17	0	24	0
10	20	2	48	23	47	53	14	0	28	20
15	21	15	45	43	49	70	22	2	44	46
20	23	44	46	62	48	76	20	16	46	89
25	22	32	43	77	46	66	29	46	59	95
30	21	26	58	80	49	79	30	44	45	109
35	38	45	62	74	45	89	39	70	63	133
40	24	59	56	78	38	90	21	66	44	135
45	33	58	60	98	43	80	36	98	83	149
50	35	74	66	127	47	85	40	110	78	157
55	34	69	60	118	38	91	59	94	73	168
60	42	77	61	120	42	76	107	88	77	158
70	25	78	79	122	33	78	75	100	79	186
80	44	85	75	139	46	74	84	113	69	192
90	49	67	92	161	55	68	91	83	97	182
100	53	72	107	160	57	72	82	95	100	173
110	45	71	95	169	43	70	76	97	88	172
120	49	79	76	159	44	64	55	100	130	151
150	48	58	103	172	47	77	56	102	114	155
180	56	58	185	159	60	73	50	95	116	132
210	58	63	133	165	69	44	69	68	90	109
240	51	62	125	145	60	45	75	61	90	116
270	64	39	140	179	54	38	78	51	80	97
300	54	42	146	118	50	40	70	46	80	95

ministration of Direct Sky Blue solution. Samples were measured spectrophotometrically.

2. Results

a) Results of Direct Sky Blue solution intraperitoneally administered normal dogs are shown in Table 3 and Figure 7.

b) Results of Direct Sky Blue solution intraperitoneally administered ascitic dogs are shown in Table 4 and Figure 8.

c) Results of Direct Sky Blue solution intravenously (right V. femoralis) administered normal dogs are shown in Table 5 and Figure 9.

d) Results of Direct Sky Blue so-

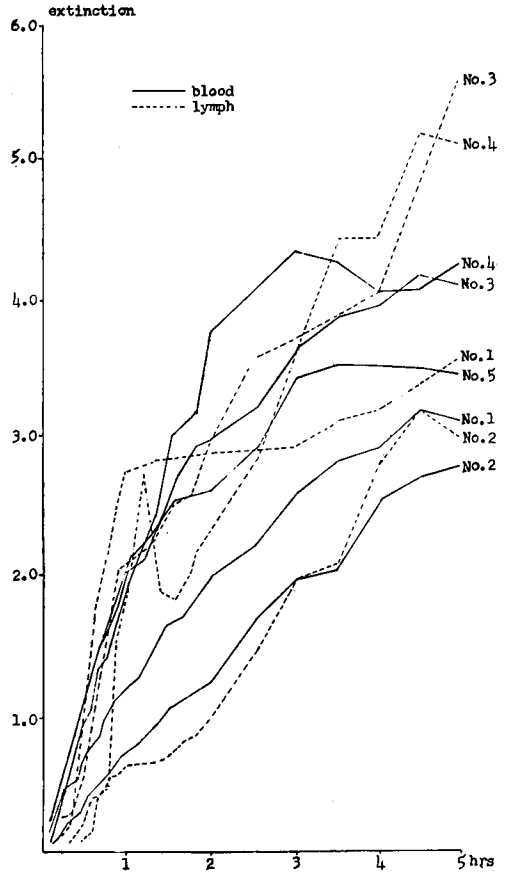

Fig. 7

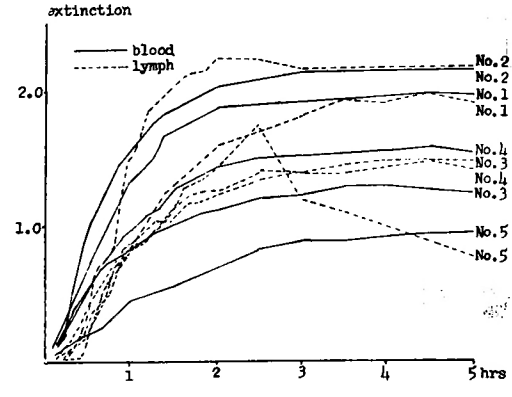

Fig. 8

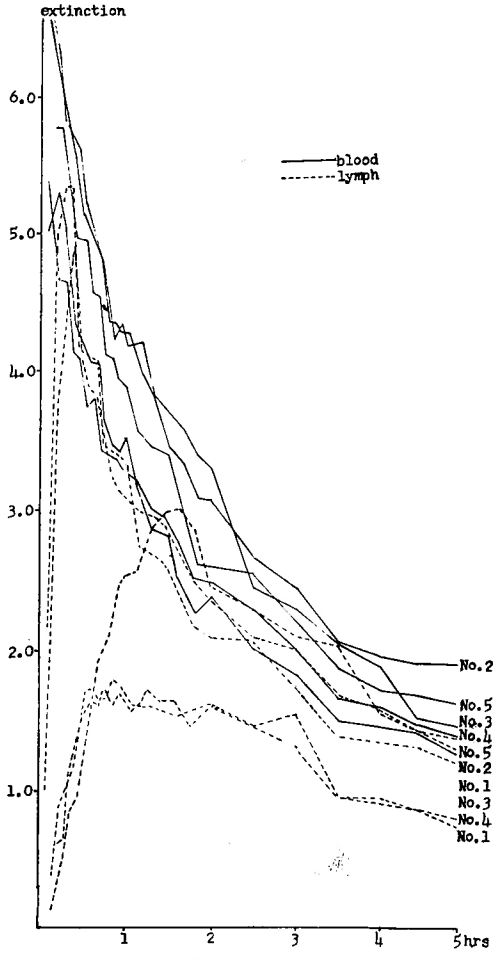

Fig. 9

lution intravenously (right V. femoralis) administered ascitic dogs are shown in Table 6 and Figure 10.

e) Results of Direct Sky Blue solution intravenously (V. cephalica antebrachii) administered ascitic dogs are shown in Table 7 and Figure 11.

3. Summary of this chapter

Each mean value of the concentration of Direct Sky Blue, administered into the peritoneal cavity, shows that the dye appears into the blood stream of normal dog within five minutes and continues to increase for five hours, but in ascitic dog, the dye appears into the blood stream within five minutes and reaches peak three hours later, which keeps almost the same level. And yet the highest value of ascitic dog is far lower than that of normal dog (Fig. 12).

The value of the thoracic duct lymph has the same tendency as is illustrated in Figure 13.

In conclusion, Direct Sky Blue, the dye, is absorbed through the peritoneum of normal dog easier than that of ascitic dog. In normal dog, Direct Sky Blue appears into the blood stream within five minutes, into the thoracic duct lymph within fifteen minutes, but on the way the concentration of the dye in the lymph abruptly increases

Tab. 3

Min.	No. 1		No. 2		No. 3		No. 4		No. 5	
	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph
5	0.09	0	0.052	0	0.16	0	0.02	0	0.2	
10	0.27	0	0.086	0	0.4	0	0.2	0	0.36	
15	0.44	0.104	0.176	0.04	0.56	0.26	0.32	0	0.54	
20	0.46	0.16	0.218	0.12	0.8	0.26	0.46	0	0.72	
25	0.496	0.494	0.26	0.18	0.92	0.32	0.64	0	0.9	
30	0.64	0.82	0.346	0.24	1.12	0.48	0.8	0.1	1.03	Could not collect.
35	0.74	1.2	0.426	0.38	1.28	0.72	1.0	0.16	1.16	
40	0.79	1.9	0.484	0.42	1.44	1.12	1.08	0.4	1.36	
45	0.96	2.1	0.52	0.49	1.52	1.44	1.36	0.44	1.5	
50	1.04	2.5	0.59	0.55	1.76	1.76	1.40	0.48	1.59	
55	1.10	2.7	0.684	0.57	1.84	1.92	1.48	1.04	1.68	
60	1.16	2.72	0.72	0.62	2.04	2.08	1.68	1.56	1.8	
70	1.24	2.78	0.78	0.63	2.08	2.16	2.04	2.0	2.18	
80	1.46	2.81	0.88	0.65	2.20	2.24	2.28	2.8	2.26	
90	1.64	2.82	1.024	0.69	2.56	2.48	2.56	1.84	2.42	
100	1.66	2.83	1.088	0.78	2.78	2.56	3.0	1.80	2.54	
110	1.82	2.84	1.16	0.848	2.96	2.64	3.08	1.96	2.57	
120	1.96	2.86	1.18	0.968	3.0	2.96	3.16	2.2	2.6	
150	2.2	2.88	1.64	1.40	3.2	3.60	3.80	2.60	2.88	
180	2.56	2.9	1.96	1.96	3.68	3.70	4.28	3.16	3.4	
210	2.8	3.1	2.0	2.04	3.92	3.92	4.2	4.4	3.5	
240	2.9	3.2	2.5	2.8	4.0	4.08	4.0	4.4	3.5	
270	3.2	3.4	2.68	3.2	4.24	5.04	4.0	5.2	3.5	
300	3.1	3.6	2.76	3.0	1.16	5.92	4.2	5.12	3.46	

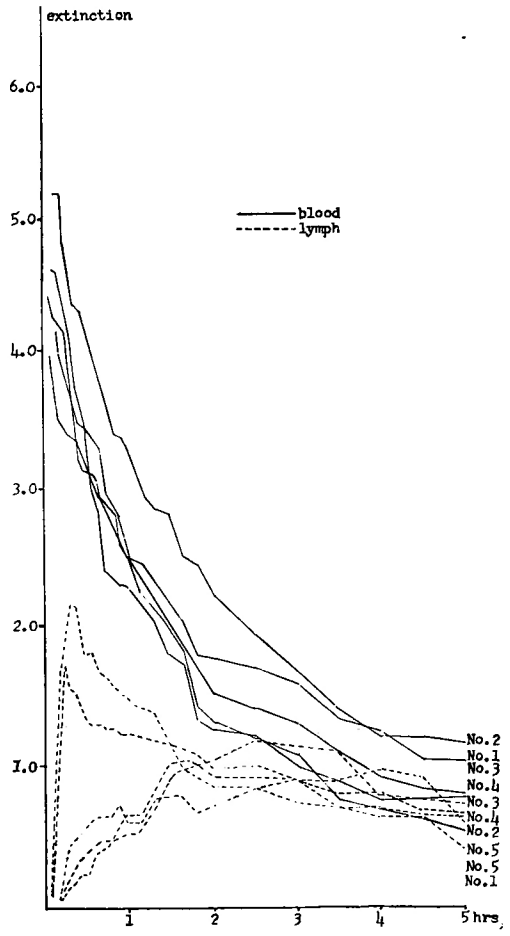

Fig. 10

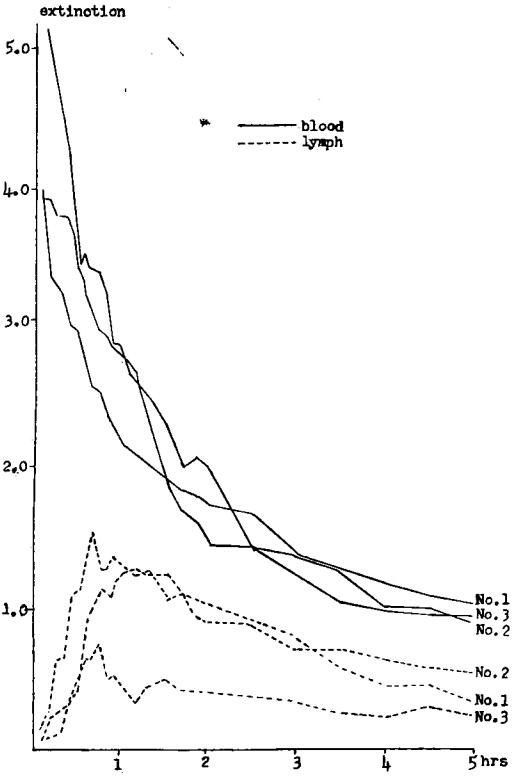

Fig. 11

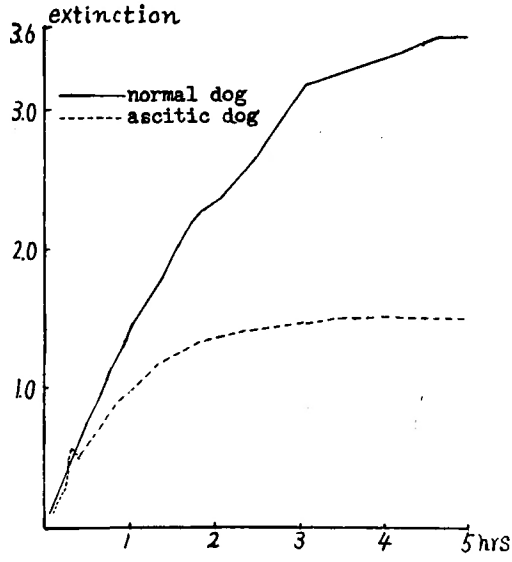

Fig. 12

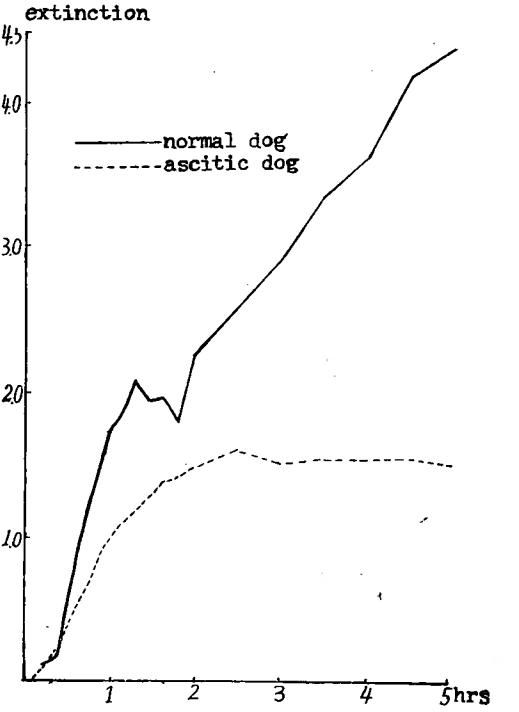

Fig. 13

Tab. 4

Min.	No. 1		No. 2		No. 3		No. 4		No. 5	
	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph
5	0.135	0	0.109	0	0.093	0.013	0.06	0	0.02	0
10	0.265	0.017	0.231	0.015	0.19	0.04	0.14	0.028	0.06	0.04
15	0.41	0.068	0.42	0.07	0.27	0.093	0.225	0.036	0.10	0.1
20	0.555	0.14	0.61	0.187	0.37	0.156	0.328	0.062	0.16	0.16
25	0.7	0.24	0.78	0.3	0.45	0.255	0.412	0.116	0.2	0.21
30	0.82	0.34	0.96	0.525	0.52	0.366	0.52	0.142	0.2	0.32
35	0.95	0.44	1.01	0.6	0.58	0.454	0.61	0.34	0.22	0.42
40	1.06	0.59	1.16	0.635	0.64	0.55	0.69	0.5	0.25	0.46
45	1.15	0.71	1.26	0.72	0.7	0.6	0.76	0.6	0.3	0.5
50	1.25	0.79	1.36	1.08	0.74	0.69	0.85	0.64	0.34	0.68
55	1.32	0.86	1.4	1.35	0.77	0.76	0.9	0.72	0.4	0.8
60	1.36	0.9	1.45	1.4	0.8	0.8	0.954	0.83	0.44	0.84
70	1.48	1.14	1.6	1.7	0.87	0.89	1.05	0.858	0.5	1.0
80	1.65	1.24	1.7	1.8	0.93	0.98	1.18	0.99	0.53	1.04
90	1.7	1.34	1.76	1.9	0.97	1.0	1.25	1.15	0.56	1.08
100	1.75	1.44	1.8	2.0	1.0	1.12	1.3	1.2	0.6	1.3
110	1.8	1.5	1.85	2.0	1.05	1.13	1.34	1.22	0.63	1.32
120	1.85	1.6	1.9	2.1	1.06	1.17	1.4	1.25	0.67	1.4
150	1.88	1.7	1.95	2.1	1.15	1.28	1.45	1.35	0.82	1.7
180	1.9	1.8	2.0	2.0	1.16	1.35	1.48	1.35	0.86	1.2
210	1.9	1.9	2.0	2.0	1.24	1.4	1.5	1.35	0.88	1.1
240	1.93	1.9	2.0	2.0	1.24	1.44	1.5	1.4	0.9	0.97
270	1.95	1.95	2.0	2.0	1.22	1.45	1.55	1.45	0.9	0.88
300	1.93	1.9	1.99	2.0	1.2	1.42	1.5	1.4	0.9	0.78

and surpasses the concentration of the dye in the blood (Fig. 14).

In ascitic dog, this inclination is the same as in normal dog but the appearance of the dye into the thoracic duct lymph is somewhat faster than that of normal dog (Fig. 15).

After the administration of Direct Sky Blue solution into the right V. femoralis in normal dog, the concentration in the blood collected from the right A. femoralis and the lymph from the thoracic duct fistula were examined. Then, it was found that the dye appeared into the thoracic duct lymph within five minutes (Fig. 16).

Together the results described above and the fact that the appearance of the dye into the thoracic duct lymph was within fifteen minutes when it was administered intraperitoneally show that the dye absorbed from the peritoneum seems to enter into the blood stream at first, then from the blood stream appears into the lymph stream. The dye concentration in the lymph surpasses that of the blood on the way, and this fact indicates that the lymphatic absorption begins later.

Namely, the appearance of Direct Sky Blue into the thoracic duct lymph is due to the hematogenic absorption in the beginning, and then additional lymphatic ab-

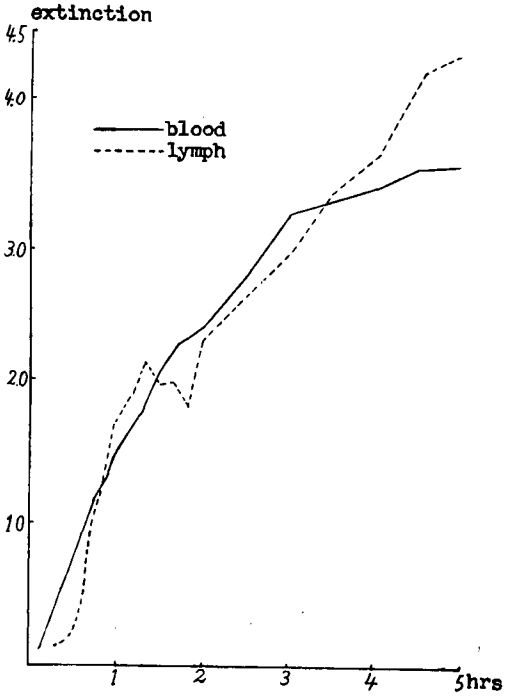

Fig. 14

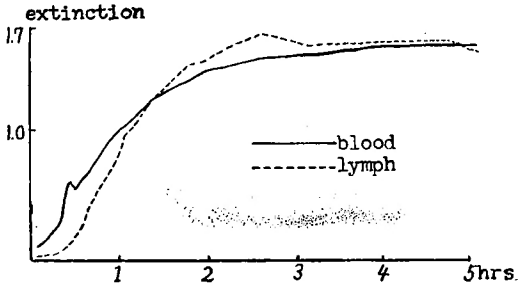

Fig. 15

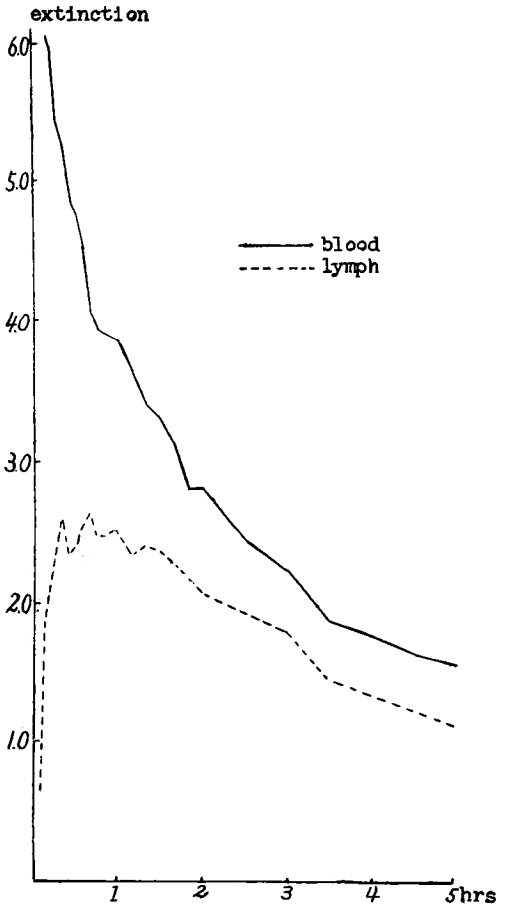

Fig. 16

sorption follows in the later stage.

In ascitic dog, the highest value of the dye in the lymph is lower than that of normal dog. However, the inclination of the concentration is the same in both cases (Fig. 17).

In the next experiment, Direct Sky Blue solution was injected into the left V. cephalica antebrachii of ascitic dog. There is no significant difference between the result of ascitic dog administered into the V. femoralis and that of administered into the V. cephalica antebrachii (Fig. 18).

In conclusion, the absorption of the dye from the peritoneal cavity is through both hematogenic and lymphatic route, but the latter takes place in the later stage.

Tab. 5

Min.	No. 1		No. 2		No. 3		No. 4		No. 5	
	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph
5	5.80	0	6.6	0	6.60	2.20	5.40	0	5.80	1.00
10	5.36	0	6.4	0.14	6.40	5.08	5.08	0.36	5.80	3.96
15	5.20	0.64	5.8	0.40	5.80	5.40	4.60	0.76	5.60	4.40
20	4.92	0.68	5.6	0.84	5.72	5.40	4.60	0.96	5.08	5.12
25	4.32	1.11	5.2	0.92	5.60	4.20	4.08	1.08	4.96	4.28
30	4.20	1.38	5.08	1.08	5.20	4.12	4.00	1.40	4.96	4.00
35	4.06	1.60	5.00	1.40	5.00	4.12	3.68	1.72	4.56	3.84
40	4.06	1.70	4.8	1.80	4.80	4.12	3.80	1.72	4.52	3.80
45	3.64	1.65	4.4	2.04	4.40	3.44	3.40	1.64	4.12	3.50
50	3.48	1.80	4.4	2.20	4.20	3.44	3.32	1.68	4.08	3.20
55	3.40	1.65	4.32	2.52	4.40	3.40	3.32	1.80	3.92	3.12
60	3.56	1.77	4.32	2.60	4.20	3.32	3.24	1.76	3.88	3.10
70	3.12	1.62	4.00	2.64	4.24	2.72	3.16	1.60	3.52	3.00
80	2.84	1.77	3.80	2.96	3.80	2.68	2.96	1.60	3.44	2.96
90	2.84	1.68	3.48	3.08	3.72	2.60	2.88	1.56	3.40	2.88
100	2.48	1.68	3.40	3.12	3.60	2.40	2.68	1.52	3.00	2.64
110	2.24	1.50	3.12	3.00	3.40	2.20	2.44	1.60	2.60	2.48
120	2.40	1.65	3.12	2.56	3.32	2.12	2.44	1.64	2.60	2.36
150	2.08	1.47	2.72	2.40	2.44	2.08	2.28	1.48	2.56	2.12
180	1.88	1.32	2.52	2.20	2.32	1.80	2.00	1.52	2.28	2.04
210	1.52	0.99	2.16	2.12	2.08	1.40	1.60	0.92	1.88	1.72
240	1.48	0.96	2.04	1.68	1.92	1.36	1.56	0.92	1.72	1.64
270	1.46	0.90	2.00	1.52	1.52	1.32	1.44	0.84	1.68	1.44
300	1.28	0.78	2.00	1.40	1.48	1.20	1.36	0.78	1.64	1.40

ADMINISTRATION OF INDIA INK INTO THE PERITONEAL CAVITY

1. Materials and methods

India ink, diluted with normal saline solution by seven times, was administered seven cc per kg of body weight into the peritoneal cavities of both normal and ascitic (ascites was emptied before experiments) dogs. Normal dogs were sacrificed by injection of Ravonal (pentothal sodium) ten minutes, thirty minutes and sixty minutes after India ink administration. Ascitic dogs were sacrificed with the same method ten minutes, thirty minutes, sixty minutes and three hundred minutes after the procedure.

Then, the sternal lymph nodes were extirpated and examined microscopically.

2. Results

a) Results of normal dogs

Five dogs were sacrificed after ten minutes.

No. 1……Particles of India ink were found.

No. 2……Particles of India ink were found.

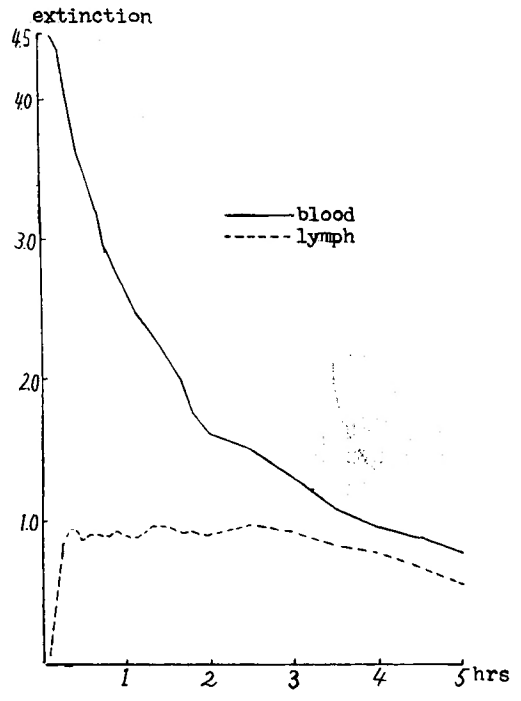

Fig. 17

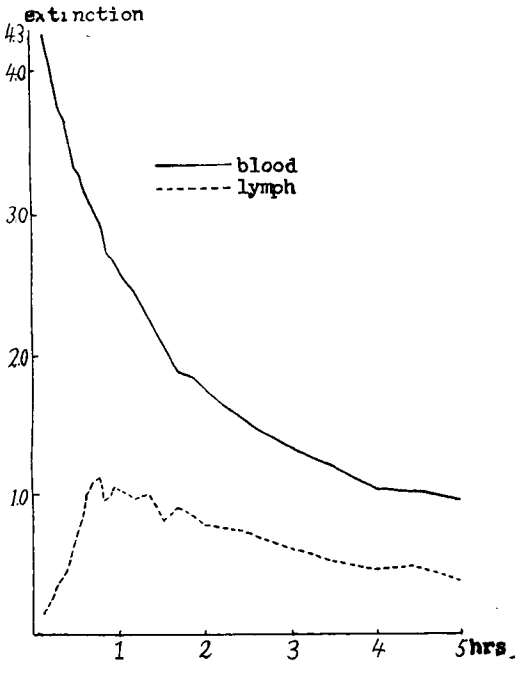

Fig. 18

No. 3……Particles of India ink were found.
No. 4……Particles of India ink were *not* found.
No. 5……Particles of India ink were *not* found.

Five dogs were sacrificed after thirty minutes.

No. 1……Particles of India ink were found.
No. 2……Particles of India ink were found.
No. 3……Particles of India ink were found.
No. 4……Particles of India ink were found.
No. 5……Particles of India ink were found.

Four dogs were sacrificed after sixty minutes.

No. 1……Particles of India ink were found.
No. 2……Particles of India ink were found.
No. 3……Particles of India ink were found.
No. 4……Particles of India ink were found.

b) Results of ascitic dogs

Four dogs were sacrificed after ten minutes.

No. 1……Particles of India ink were *not* found.
No. 2 ……Particles of India ink were found.
No. 3 ……Particles of India ink were found.
No. 4……Particles of India ink were *not* found.

Four dogs were sacrificed after thirty minutes.

Tab. 6

Min.	No. 1		No. 2		No. 3		No. 4		No. 5	
	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph	Blood	Lymph
5	4.4	0.068	5.2	0.08	3.88	0	4.2	0	4.64	0
10	4.2	1.08	5.2	0.96	3.60	0.10	4.2	0.04	4.60	0.08
15	4.12	1.76	4.8	1.84	3.48	0.20	3.92	0.128	4.24	0.36
20	3.82	1.56	4.4	2.24	3.40	0.292	3.68	0.168	4.08	0.48
25	3.2	1.48	4.32	2.20	3.36	0.340	3.48	0.24	3.60	0.52
30	3.1	1.36	4.2	1.84	3.28	0.40	3.44	0.24	3.44	0.60
35	3.08	1.32	4.0	1.88	3.16	0.44	3.00	0.36	3.36	0.65
40	2.92	1.32	3.8	1.76	2.96	0.48	2.84	0.40	3.30	0.68
45	2.85	1.28	3.6	1.72	2.92	0.48	2.40	0.44	2.92	0.68
50	2.8	1.28	3.42	1.64	2.80	0.48	2.36	0.52	2.88	0.68
55	2.56	1.24	3.4	1.60	2.64	0.50	2.32	0.64	2.80	0.78
60	2.48	1.24	3.32	1.56	2.56	0.528	2.32	0.68	2.60	0.64
70	2.44	1.22	3.00	1.48	2.36	0.540	2.16	0.68	2.28	0.64
80	2.30	1.20	2.88	1.44	2.20	0.680	2.04	0.86	2.16	0.82
90	2.16	1.16	2.84	1.28	2.00	0.880	1.80	1.04	2.00	0.84
100	2.04	1.12	2.56	1.08	1.88	1.00	1.74	1.08	1.84	0.84
110	1.80	1.08	2.48	0.96	1.72	1.02	1.32	1.04	1.44	0.72
120	1.78	1.0	2.28	0.90	1.52	1.04	1.28	0.96	1.36	0.76
150	1.72	1.04	2.00	0.90	1.44	1.20	1.24	1.04	1.24	0.89
180	1.60	0.92	1.76	0.80	1.32	1.16	1.02	1.04	1.12	0.96
210	1.36	0.74	1.48	0.76	1.12	1.12	0.92	0.84	0.80	0.96
240	1.28	0.68	1.28	0.76	0.92	0.80	0.80	0.84	0.76	1.04
270	1.08	0.68	1.28	0.72	0.84	0.76	0.80	0.72	0.68	0.96
300	1.08	0.48	1.25	0.50	0.80	0.74	0.80	0.72	0.60	0.68

No. 1……Particles of India ink were found.
No. 2……Particles of India ink were *not* found.
No. 3……Particles of India ink were *not* found.
No. 4……Particles of India ink were *not* found.

Five dogs were sacrificed after sixty minutes.

No. 1……Particles of India ink were *not* found.
No. 2……Particles of India ink were found.
No. 3……Particles of India ink were *not* found.
No. 4……Particles of India ink were *not* found.
No. 5……Particles of India ink were *not* found.

Five dogs were sacrificed after three hundred minutes.

No. 1……Particles of India ink were *not* found.
No. 2……Particles of India ink were found.
No. 3……Particles of India ink were found.
No. 4……Particles of India ink were found.
No. 5……Particles of India ink were found.

3. Summary of this chapter

In the cases of ten minutes after intraperitoneal administration of India-ink, carbon particles were found obviously in three out of five cases of normal dogs, but were very slightly in two out of four cases of ascitic dogs. In the cases of thirty and sixty minutes after procedure, particles of India ink were found obviously in all normal dogs. In ascitic dogs, on the contrary, particles were found only one out of four after thirty minutes cases, one out of five after sixty minutes cases and four out of five after three hundred minutes cases.

In conclusion, the peritoneal absorbability of particles of India ink of ascitic dog is inferior to that of normal dog.

Tab. 7

Min	No. 1		No. 2		No. 3	
	Blood	Lymph	Blood	Lymph	Blood	Lymph
5	3.84	0.14	5.2	0.07	3.82	0.06
10	3.5	0.32	4.8	0.08	3.82	0.2
15	3.2	0.63	4.48	0.14	3.7	0.24
20	3.12	0.64	4.2	0.31	3.7	0.28
25	2.92	1.08	3.42	0.42	3.6	0.36
30	2.88	1.1	3.56	0.74	3.28	0.48
35	2.64	1.36	3.44	0.98	3.12	0.64
40	2.5	1.54	3.42	1.08	3.02	0.62
45	2.44	1.42	3.28	1.20	2.88	0.72
50	2.28	1.24	2.88	1.12	2.84	0.48
55	2.2	1.36	2.88	1.24	2.76	0.52
60	2.12	1.28	2.72	1.29	2.72	0.46
70	2.04	1.20	2.56	1.32	2.6	0.32
80	1.96	1.22	2.44	1.28	2.2	0.44
90	1.88	1.04	2.24	1.28	1.9	0.48
100	1.80	1.08	2.0	1.16	1.68	0.4
110	1.76	1.04	2.1	0.97	1.57	0.4
120	1.68	0.98	2.0	0.92	1.41	0.38
150	1.60	0.84	1.44	0.90	1.4	0.36
180	1.32	0.73	1.38	0.73	1.2	0.32
210	1.22	0.52	1.28	0.72	1.0	0.24
240	1.12	0.40	1.02	0.65	0.94	0.21
270	1.04	0.42	1.0	0.60	0.92	0.28
300	0.98	0.30	0.93	0.56	0.9	0.24

DISCUSSION

There have been many concepts about absorption from the peritoneal cavity. In 1863, v. RECKLINGHAUSEN stated that there was direct connecting stoma between the peritoneal cavity and lymphatics.

But this stoma was thought to be artefact by KOLOSSOW, MUSCATELLO, MACCALLUM, DANDY, ROWNTREE and others. On the other hand, STARLING, HAIDENHAIN, HANBURGER and others described that the water soluble dye was rapidly absorbed from the peritoneal cavity into the blood stream.

Recently, it has become clear that ascites is not a simple pool of body fluid, but a state of dynamic equilibrium, which is always coming in and out the peritoneal cavity even though it seems to be in static state. McKEE, who observed the fact that the labeled plasma protein given intraperitoneally appeared into the blood stream and given intravenously it appeared into the peritoneal cavity, used the term "the circulation of ascitic fluid".

Literatures on the peritoneal absorbability of experimental ascitic dog are very few. In 1921, BOLTON investigated the absorbability by means of classical methods. Recently McKEE described the results with the radioactive labeled erythrocytes.

Now, administering the various substances, P^{32}, Direct Sky Blue solution or India ink, intraperitoneally to both normal and ascitic dogs findings of the blood,

lymph and lymph node samples show that the peritoneal absorbability of ascitic dog is inferior to that of normal dog.

But still remains the question why the peritoneal absorbability of the ascitic dog is inferior to that of normal dog. According to MATSUDA, there is no significant difference in the peritoneal absorbability between the normal rabbit and the rabbit with injured liver after the intraperitoneal administration of phenolsulfonphthalein. IMANAGA et al. reported that phenolsulfonphthalein, administered intraperitoneally, appeared faster into the urine of normal dog than that of the dog with the constricted V. hepatica. But, when the portocaval shunt was added to the dog with the constricted V. hepatica, the appearance of the dye into the urine became faster to the same grade of normal dog. Then, they concluded that the absorbability of the peritoneum depended upon the portal blood circulation.

Namely, the absorbability of the peritoneum depends upon the portal blood circulation and not upon the liver itself. But this problem requires for further studies from various aspects.

CONCLUSION

Various substances were administered into the peritoneal cavities and the blood vessels of both ascitic and normal dogs. And their concentration in the blood and lymph were measured, and the sternal lymph nodes were examined microscopically.

Results obtained are as follows:

1. Collecting and counting the blood samples from A. femoralis and lymph samples from the thoracic duct fistula after the administration of P^{32} into the peritoneal cavities of both ascitic (ascites was emptied) and normal dog, the peritoneal absorbability of ascitic dog is inferior to that of normal dog.
2. Administrering Direct Sky Blue solution in the same way, the peritoneal absorbability of ascitic dog is inferior to that of normal dog.
3. P^{32} and Direct Sky Blue are absorbed from the peritoneal cavity through both hematogenic and lymphogenic.
4. Microscoping the precipitation of intraperitoneally administered India ink, the peritoneal absorbability of ascitic dog is inferior to that of normal dog.

In short, the peritoneal absorbability of ascitic dog is inferior to that of normal dog, both with liquid and particles, and this is one of the reasons for ascites formation.

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和文抄録

腹水腹膜の吸収能に関する実験的研究

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胸部下大静脈狭窄による腹水犬の腹膜吸収能を種々の物質を腹腔内に注入して正常犬のそれと比較検討した．

1) P^{32} 及びスカイブルーは血行性並びにリンパ行性に，墨汁粒子はリンパ行性に腹腔内より吸収される．

2) P^{32} を腹水犬並びに正常犬の腹腔内に注入し，股動脈より血液を，胸管リンパ瘻よりリンパを夫々時間を追つて採取し放射能を測定すると，腹水犬では正常犬に比して腹膜の吸収能が劣る（Fig. 3, Fig. 4）．

3) スカイブルーを腹水犬並びに正常犬の腹腔内に注入し，同様に血液及びリンパを採取し夫々の濃度を光電比色計で測定すると腹水犬の腹膜吸収能は正常犬のそれに比して劣る（Fig. 12, Fig. 13）．

4) 墨汁を腹腔内に注入し，時間を追つて胸骨リンパ腺を剔出し墨汁粒子の沈着状態を組織学的に検索すると腹水犬では明らかに正常犬に比して少ない．

即ち腹水犬ではその腹膜の吸収能は正常犬に比して液状のものに就いても粒子状のものに就いても劣る．これが腹水貯溜の原因的因子の一つである．